Contents

Preface vii

Conference Organization ix

Sponsors x

Semiconductor surfaces

Ab initio calculations of structural and electronic properties of prototype surfaces of group IV, III–V and II–VI semiconductors
J. Pollmann, P. Krüger, M. Rohlfing, M. Sabisch and D. Vogel 1

Plasmon excitations and the effects of surface preparation in n-type InAs(001) studied by electron energy loss spectroscopy
G.R. Bell, C.F. McConville and T.S. Jones 17

Investigation of the space charge regime of epitaxially grown GaAs (100) by high-resolution electron energy-loss spectroscopy
V.M. Polyakov, A. Elbe, J. Wu, G.J. Lapeyre and J.A. Schaefer 24

Kinematical RHEED simulation of different structure models for the GaAs (311)A surface
W. Braun, O. Brandt, M. Wassermeier, L. Däweritz and K. Ploog 35

Ab initio calculations of the reconstructed (100) surfaces of cubic silicon carbide
P. Käckell, J. Furthmüller and F. Bechstedt 45

Chemical preparation of CdTe(100) and (110) surfaces using atomic hydrogen
Y. Luo, D.A. Slater, M. Levy and R.M. Osgood Jr. 49

Photoexcited carrier diffusion near a Si(111) surface and in the Si bulk
C.M. Li, T. Sjodin, Z.C. Ying and H.L. Dai 57

In-situ monitoring of surface chemistry and charge transfer at semiconductor surfaces
E. Fefer, L. Kronik, M. Leibovitch, Y. Shapira and W. Riedl 61

Electronic structure of the valence band of GdS_x and Gd_3S_4
V.A. Grazhulis, S.I. Bozhko, I.L. Bolotin, O.R. Bulanov and A.M. Ionov 68

Surfaces and adsorbates

Sb or Cs covered InAs(110) surfaces: moving E_F into conduction band and quantized 2D electron channel
V.Yu. Aristov, M. Grehk, V.M. Zhilin, A. Taleb-Ibrahimi, G. Indlekofer, Z. Hurych, G. LeLay and P. Soukiassian 73

Synchrotron radiation study of Cs/carbon-rich β-SiC(100) and Cs/silicon-rich β-SiC(100) surfaces: metallization and interface formation
F. Semond, P. Soukiassian, P.S. Mangat, Z. Hurych, L. di Cioccio and C. Jaussaud 79

Surface core-level shift photoelectron diffraction from As/Si(111)
L.S.O. Johansson, R. Gunnella, E.L. Bullock, C.R. Natoli and R.I.G. Uhrberg 88

Fluorine adsorption on GaAs(110) surfaces and the onset of etching after XeF_2 exposures
H. Nienhaus and W. Mönch 95

An ARUPS/NEXAFS study of the H_2S/InP(110) adsorbate system
E. Dudzik, A. Leslie, E. O'Toole, I.T. McGovern, A. Patchett and D.R.T. Zahn 101

Preparation of H-terminated Si surfaces and their characterisation by measuring the surface state density
H. Angermann, K. Kliefoth and H. Flietner 107

Ge(111)3 × 1:K/Sn; on the influence of tin substitution in a metal induced 3 × 1 reconstruction
M. Göthelid, S. Odasso, G. LeLay, M. Björkqvist, E. Janin, U.O. Karlsson and T.M. Grehk 113

Si(110)16 × 2 and Si(110)2 × 3-Sb surfaces studied by photoemission and optical spectroscopy
A. Cricenti, P. Perfetti, B. Nesterenko, G. LeLay and C. Sébenne 118

The atomic structure of the Si(111) $(2\sqrt{3} \times 2\sqrt{3})$R30°-Sn reconstruction
A.H. Levermann, P.B. Howes, K.A. Edwards, H.T. Anyele, C.C. Matthai, J.E. Macdonald, R. Feidenhans'l, L. Lottermoser, L. Seehofer, G. Falkenberg and R.L. Johnson 124

Atomic phenomena on Si surfaces at adsorption of transition metals
B.Z. Olshanetsky 130

Hydrogenated and oxidized vicinal Si(001) surfaces investigated by reflectance-difference spectroscopy
U. Rossow, L. Mantese, T. Yasuda and D.E. Aspnes 137

Se-induced 3d core-level shifts of GaAs(110)
P. Käckell, W.G. Schmidt and F. Bechstedt 141

Optical study of potassium growth on the Si(100) surface
M. Roy and Y. Borensztein 147

A surface extended X-ray absorption fine structure study of tellurium adsorbed onto Si(100)
S.R. Burgess, B.C.C. Cowie, S.P. Wilks, P.R. Dunstan, C.J. Dunscombe and R.H. Williams 152

Optical spectroscopy study of hydrogenation of the Si(111)-7 × 7 surface
M. Roy, C. Beitia, Y. Borensztein, A. Shkrebtii, C. Noguez and R. Del Sole 158

Dissolution and segregation of monolayer Cu, Ni and Co atoms on the Si(111)-$\sqrt{3} \times \sqrt{3}$-Ag surface induced by thermal annealing
J. Yuhara, R. Ishigami, D. Ishikawa and K. Morita 163

Segregation of In atoms at clean and hydrogen passivated InP(100) surfaces
F. Stietz, Th. Allinger, V. Polyakov, J. Woll, A. Goldmann, W. Erfurth, G.J. Lapeyre and J.A. Schaefer 169

Electronic properties of antimony monolayers on III–V (110) surfaces: a comparative study by reflectance anisotropy spectroscopy and microscopic tight-binding calculations
A.I. Shkrebtii, N. Esser, M. Köpp, P. Haier, W. Richter and R. Del Sole 176

Metals on semiconductors

Schottky-barrier formation at passivated surfaces: covalent and ionic semiconductors
R. Saiz-Pardo, R. Rincón, P.L. de Andrés and F. Flores 183

Midgap states observed by nonlinear optical spectroscopy of metal:GaAs junctions
J. Qi, W. Angerer, M.S. Yeganeh, A.G. Yodh and W.M. Theis 188

Spatially resolved internal and external photoemission of Pt/n-GaP Schottky barrier
C. Coluzza, J. Almeida, T. dell'Orto, F. Barbo, M. Bertolo, A. Bianco, S. Cerasari, S. Fontana, O. Bergossi, M. Spajer and D. Courjon 196

Structural properties of epitaxial silicide layers on Si
H. von Känel, E. Müller, S. Goncalves-Conto, C. Schwarz and N. Onda 204

Atomistic study of the formation process of Ni silicide on the Si(111)-7 × 7 surface with scanning tunneling microscopy
T. Yao, S. Shinabe and M. Yoshimura 213

Analytical studies of nickel silicide formation through a thin Ti layer
F. Fenske, A. Schöpke, S. Schulze and B. Selle 218

Scanning tunneling spectroscopy examination of surface electronic structures of Si(111)$(2\sqrt{3} \times 2\sqrt{3})$30°-Sn surface
X.F. Lin, I. Chizhov, H.A. Mai and R.F. Willis 223

Unpinned behavior of the Fermi level and photovoltage on p-(100)GaAs surface facilitated by deposition of cesium
V.L. Alperovich, A.G. Paulish, H.E. Scheibler, V.I. Tynnyi and A.S. Terekhov 228

Development of the Na/GaAs(111)A-(2 × 2) interface at room and low temperature
J.M.C. Thornton, P. Weightman, P. Bailey, D.A. Woolf, A.D. Laine and D.A. Evans 234

Metal overlayers on the MBE-grown ZnSe(001) surface
D.A. Evans, D. Wolfframm, D. Gnoth, J. Cairns, A.C. Wright, M. Evans, J. Riley, D. Westwood and D.A. Woolf 240

Metal–insulator transition for K on GaAs(100)–As rich surfaces
A. Levy Yeyati, A. Martín-Rodero, F. Flores, J. Ortega and R. Rincón 248

Quantitative analysis of degradation in Schottky diode characteristics induced by single ion implantation
M. Koyama, Y. Akita, C. Cheong, M. Koh, T. Matsukawa, K. Horita, B. Shigeta and I. Ohdomari 253

A normal incidence X-ray standing wave study of sulphur adsorption on InP(110)
T.K. Johal, P. Finetti, V.R. Dhanak, A.W. Robinson, A. Patchett, D.R.T. Zahn and R. McGrath 257

The Schottky barrier of Co on strained and unstrained Si_xGe_{1-x} alloys
J.-H. Ku and R.J. Nemanich 262

Characterization of cobalt–diamond (100) interfaces: electron affinity and Schottky barrier
P.K. Baumann and R.J. Nemanich 267

Hot-electron scattering at Au/Si(100) Schottky interfaces measured by temperature dependent ballistic electron emission microscopy
C.A. Ventrice Jr., V.P. LaBella, G. Ramaswamy, H.-P. Yu and L.J. Schowalter 274

Valence band of $Cd_{1-x}Fe_xSe$/Fe in resonant photoemission spectra
B.A. Orlowski, B.J. Kowalski, N. Barrett, D. Martinotti, C. Guillot, J.-P. Lacharme and C.A. Sébenne 282

Atom manipulation on surfaces

Intrinsic surface atom manipulations in STM and AFM
K. Cho and J.D. Joannopoulos 286

Surface diffusion limitation in laser focused atomic deposition
R.E. Behringer, V. Natarajan and G. Timp 291

Surface dynamics and simulation

Graphitization of diamond (111) studied by first principles molecular dynamics
A. De Vita, G. Galli, A. Canning and R. Car 297

A comparative study of the adsorption and thermal decomposition of triethylgallium and trimethylgallium at GaAs(100) surfaces studied by electron energy loss spectroscopy
A.A. Aquino and T.S. Jones 304

Smoothing of crystal surfaces during growth interruption
A.Yu. Kaminski and R.A. Suris 312

Thin insulators on semiconductors

Comparison of structurally relaxed models of the Si(001)–SiO_2 interface based on different crystalline oxide forms
A. Pasquarello, M.S. Hybertsen and R. Car 317

Initial stage of oxidation of hydrogen-terminated silicon surfaces
T. Hattori, T. Aiba, E. Iijima, Y. Okube, H. Nohira, N. Tate and M. Katayama 323

The initial oxidation of silicon: new ion scattering results in the ultra-thin regime
E.P. Gusev, H.C. Lu, T. Gustafsson and E. Garfunkel 329

Local atomic structure and electrical properties of nitrided Si–SiO_2 interfaces produced by low-temperature plasma processing and rapid thermal annealing, and explained by ab-initio quantum chemistry calculations
G. Lucovsky, D.R. Lee, S.V. Hattangady, H. Niimi, S. Gandhi, C. Parker, Z. Jing, J.L. Whitten and J.R. Hauser 335

Density of states and relaxation spectra of etched, H-terminated and naturally oxidized Si-surfaces and the accompanied defects
H. Flietner, W. Füssel, N.D. Sinh and H. Angermann 342

Synchrotron radiation photoelectron spectroscopy of the O(2s) core level as a tool for monitoring the reducing effects of ion bombardment on SnO_2 thin films
P. De Padova, R. Larciprete, C. Ottaviani, C. Quaresima, P. Perfetti, E. Borsella, C. Astaldi, C. Comicioli, C. Crotti, M. Matteucci, M. Zacchigna and K. Prince 349

Influences of hydrogen on initial oxidation processes of H-terminated Si(100) surfaces
H. Ikeda, K. Hotta, S. Furuta, S. Zaima and Y. Yasuda 354

Effect of chemical preoxidation treatment on the structure of SiO_2/Si interfaces
H. Nohira, H. Sekikawa, M. Matsuda and T. Hattori 359

Radiation immunity of pMOSFETs and nMOSFETs examined by means of MeV He single ion microprobe
M. Koh, K. Horita, B. Shigeta, T. Matsukawa, A. Kishida, T. Tanii, S. Mori and I. Ohdomari 364

Weak fluence dependence of charge generation in ultra-thin oxides on silicon
K.R. Farmer, C.P. Debauche, A.R. Giordano, P. Lundgren, M.O. Andersson and D.A. Buchanan 369

Studies on low temperature silicon grain growth on SiO_2 by electron cyclotron resonance chemical vapor deposition
K.C. Wang, H.L. Hwang, J.J. Loferski and T.R. Yew 373

Characterization of nitrided SiO_2 thin films using secondary ion mass spectrometry
M.R. Frost and C.W. Magee 379

Plasma assisted oxidation of SiGe layers at 500°C: interface characterization
C. Tételin, X. Wallart, L. Vescan and J.P. Nys 385

Diffraction spot profile analysis for heteroepitaxial surfaces applied to the initial growth stages of CaF_2 adlayers on Si(111)
J. Wollschläger and A. Meier 392

Structural transformations at CaF_2/Si(111) interfaces
N.S. Sokolov, J.C. Alvarez, Yu.V. Shusterman, N.L. Yakovlev, R.M. Overney, Y. Itoh, I. Takahashi and J. Harada 402

Molecular beam epitaxial growth of thin CaF_2 films on vicinal Si(111) surfaces
B.M. Kim, C.A. Ventrice, Jr., T. Mercer, R. Overney and L.J. Schowalter 409

Growth of CdF_2/CaF_2Si(111) heterostructure with abrupt interfaces by using thin CaF_2 buffer layer
A. Izumi, K. Kawabata, K. Tsutsui, N.S. Sokolov, S.V. Novikov and A.Yu. Khilko 417

Hydrogen ion treatments of oxidized GaAs(100) and AlGaAs(100) surfaces: surface stoichiometry and electronic properties
Y.-L. Chang, S.I. Yi, S. Shi, E. Hu, W.H. Weinberg and J. Merz 422

Interface properties of PN_x/InP structures by in-situ remote plasma processes
T. Sugino, Y. Sakamoto, T. Miyazaki and J. Shirafuji 428

Surfactants and passivation

Sulfur passivated InP(100): surface gaps and electron counting
C.E.J. Mitchell, I.G. Hill, A.B. McLean and Z.H. Lu 434

GaAs surface passivation using in-situ oxide deposition
M. Passlack, M. Hong, R.L. Opila, J.P. Mannaerts and J.R. Kwo 441

Influence of physisorbed arsenic on RHEED intensity oscillations during low-temperature GaAs molecular beam epitaxy
R. Venkatasubramanian, V.K. Pamula and D.L. Dorsey 448

Wide band gap semiconductors

UV photoemission study of heteroepitaxial AlGaN films grown on 6H-SiC
M.C. Benjamin, M.D. Bremser, T.W. Weeks, Jr., S.W. King, R.F. Davis and R.J. Nemanich 455

Initial stage of growth of GaN/GaAs(001) in plasma-assisted molecular beam epitaxy
H. Yang, O. Brandt, A. Trampert and K.H. Ploog 461

Nitridation of GaAs surfaces stimulated by nitrogen glow discharge
Q.J. Xu, X.M. Ding, X.Y. Hou and X. Wang 468

Growth and characterization of ZnSe/GaAs single quantum well structures
J.L. House, D.J. Dougherty, G.S. Petrich, L.A. Kolodziejski, E.P. Ippen and G.-C. Hua 472

Photomodulation Raman scattering spectroscopy of ZnSe/GaAs heterostructure interface
H. Talaat, L. Elissa, S. Negm and E. Burstein 479

Raman monitoring of selenium decapping and subsequent antimony deposition on MBE-grown ZnSe(100)
D. Drews, A. Schneider, D.R.T. Zahn, D. Wolfframm and D.A. Evans 485

Heterocrystalline SiC: ab initio calculations for the interface structure of combinations of cubic and hexagonal SiC
P. Käckell and F. Bechstedt 490

Growth and characterization of nanostructures

Highly mismatched heteroepitaxy: 2D platelets assisted nucleation of self-assembled 3D quantum dots
C. Priester and M. Lannoo 495

Photoluminescence and transmission electron microscopy investigation of SiGe quantum wires grown on patterned Si substrates
A. Hartmann, C. Dieker, U. Bangert, R. Loo, L. Vescan and H. Lüth 502

AFM and RHEED study of Ge islanding on Si(111) and Si(100)
P.W. Deelman, T. Thundat and L.J. Schowalter 510

Surface and subsurface imaging of indium in InGaAs by scanning tunneling microscopy
M. Pfister, M.B. Johnson, S.F. Alvarado, H.W.M. Salemink, U. Marti, D. Martin, F. Morier-Genoud and F.K. Reinhart 516

Characterization of arsenide/phosphide heterostructure interfaces by scanning tunneling microscopy
A.Y. Lew, C.H. Yan, C.W. Tu and E.T. Yu 522

Atomic force microscopy of III–V nanostructures in air
F. Reinhardt, B. Dwir, G. Biasiol and E. Kapon 529

Site occupation of Si atoms deposited on vicinal GaAs(001)-(2×4) surfaces
A.R. Avery, J.L. Sudijono, T.S. Jones and B.A. Joyce 539

Characterization of nanostructures by virtue of the phenomena due to the electron–phonon interaction
E.P. Pokatilov, V.M. Fomin, S.N. Klimin and S.N. Balaban 546

Porous silicon layers as a model system for nanostructures
U. Rossow, U. Frotscher, C. Pietryga, D.E. Aspnes and W. Richter 552

Lattice mismatched systems

Influence of surface reconstruction on MBE growth of layered GaSe on Si(111) substrates
H. Reqqass, J.-P. Lacharme, M. Eddrief, C.A. Sébenne, V. Le Thanh, Y.L. Zheng and J.-F. Pétroff 557

Heteroepitaxial growth of InSb on Si(001) surface via Ge buffer layers
M. Mori, D.M. Li, M. Yamazaki, T. Tambo, H. Ueba and C. Tatsuyama 563

Ga–Se films grown on a GaAs(001) surface at high temperature using a thermal evaporation of GaSe
T. Izumi, H. Nishiwaki, T. Tambo and C. Tatsuyama 570

MOCVD growth of Ga_2Se_3 on GaAs(100) and GaP(100): a Raman study
M. von der Emde, D.R.T. Zahn, T. Ng, N. Maung, G.H. Fan, I.B. Poole, J.O. Williams and A.C. Wright 575

Temperature dependence of interdiffusion-induced III–V compound formation at the interface between Al, Ga, In layers and Sb substrates
V. Wagner, W. Richter and J. Geurts 580

STM study of the organic semiconductor PTCDA on highly-oriented pyrolytic graphite
C. Kendrick, A. Kahn and S.R. Forrest 586

Semiconductor heterostructures

Low-energy yield spectroscopy determination of band offsets: application to the epitaxial Ge/Si(100) heterostructure
L. Di Gaspare, G. Capellini, C. Chudoba, M. Sebastiani and F. Evangelisti 595

Ultra-thin AlAs films on GaAs (001) investigated by high-resolution electron-energy-loss spectroscopy
J.-L. Guyaux, Ph. Lambin, M.D. Lange, R. Sporken, P.A. Thiry and R. Caudano 601

Band structure evolution in InAs overlayers on GaAs(110)
Z.Q. He, L. Ilver, J. Kanski, P.O. Nilsson, P. Songsiriritthigul, G. Holmén and U.O. Karlsson 608

Measurements of the energy band offsets of $Si_{1-x}Ge_x/Si$ and $Ge_{1-y}C_y/Ge$ heterojunctions
F. Chen, M.M. Waite, S. Ismat Shah, B.A. Orner, S.S. Iyer and J. Kolodzey 615

The conduction barrier at the interface between low temperature grown GaAs and undoped GaAs
K.D. Maranowski, J.P. Ibbetson, K.L. Campman and A.C. Gossard 621

$(II–VI)_m/(IV_2)_n$ (110) superlattice: interfacial chemistry, electronic structure, and optical property
E.G. Wang 626

Charge transfer and electronic activation at an Sb δ-layer in Si(001)
J.M.C. Thornton, R.J. Cole, D.J. Gravesteijn and P. Weightman 631

Strained layers

A scanning tunnelling microscopy study of local surface modifications induced by misfit dislocation formation in strained-layer heteroepitaxy
G. Springholz and G. Bauer 637

Reconstruction and chemical ordering at the surface of strained (In, Ga)As epilayers
M. Sauvage-Simkin, Y. Garreau, R. Pinchaux, A. Cavanna, M.B. Véron, N. Jedrecy, J.P. Landesman and J. Nagle 646

Interface abruptness in strained III–V heterostructures
M.R. Bruni, S. Kačiulis, G. Mattogno and G. Righini 652

Ab-initio electronic structure calculation of the InAs multiple quantum wells in bulk GaAs
N. Tit and M. Peressi 656

Medium energy ion scattering (MEIS) studies on Si/GaSb/Si- and $Si/CaF_2/Si(111)$ layer systems
T. Tappe, A. Chatziparaskewas, J. Schäffer, J. Schlosser, J. Schmalhorst and B. Schmiedeskamp 661

Clustering on surfaces at finite areal coverages
R. Barel, Y. Mai, G.R. Carlow and M. Zinke-Allmang 669

Preparation and properties of thin polycrystalline $MnSi_{1.73}$ films
St. Teichert, R. Kilper, J. Erben, D. Franke, B. Gebhard, Th. Franke, P. Häussler, W. Henrion and H. Lange 679

A summary and perspective on the Fifth International Conference on the Formation of Semiconductor Interfaces, Princeton, NJ
H. Lüth 685

Author index 690

Subject index 699